PowerMax+

USER'S MANUAL
1000W, 2000W & 3000W

A&CGREENENERGY
Renewable Energy for Life

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Models and parameter List

Model	PowerMax+300W	PowerMax+500W	PowerMax+1KW
Rated Power (w)	300	500	1,000
Rated Voltage	24VDC	24VDC	48VDC
Rotor Diameter (ft.)	8.20	8.20	8.86
Startup Wind Speed (mph)	5.6	4.5	4.5
Nominal Wind Speed (mph)	15.7	17.9	20
Shutdown Wind Speed (mph)	35.8	35.8	35.8
Rated Rotate Speed (rpm)	400	400	400
Tower Height (ft)	20 (Guyed Wire)	26	26
Inverter Type	Modified Wave	Modified Wave	Modified Wave
Suggested Battery Capacity	12V150AH x 2	12V200AH x 2	12V200AH x 4

Model	PowerMax+2KW	PowerMax+3KW	PowerMax+5KW
Rated Power (w)	2,000	3,000	5,000
Rated Voltage	120VDC	240VDC	240VDC
Rotor Diameter (ft.)	10.50	14.80	21.00
Startup Wind Speed (mph)	4.5	4.5	4.5
Nominal Wind Speed (mph)	20	22.4	22.4
Shutdown Wind Speed (mph)	35.8	55.9	55.9
Rated Rotate Speed (rpm)	400	220	200
Tower Height (ft.)	26	39.37	39.37
Inverter Type	Sine Wave	Modified Wave	Modified Wave
Suggested Battery Capacity	12V200AH x 10	12V200AH x 20	12V300AH x 20

Model	PowerMax+10KW	PowerMax+20KW
Rated Power (w)	10,000	20,000
Rated Voltage	240VDC	360VDC
Rotor Diameter (ft.)	26.25	32.81
Startup Wind Speed (mph)	4.5	4.5
Nominal Wind Speed (mph	22.4	26.84
Shutdown Wind Speed (mph)	55.9	100
Rated Rotate Speed (rpm)	180	90
Tower Height (ft.)	39.37	59
Inverter Type	Sine Wave	Sine Wave
Suggested Battery Capacity	12V400AH x 20	12V800AH x 30

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Installation Specification of Guyed Tower

Step 1: Choosing Installation Sites

The wind turbine should be erected as high and far away from obstacles in order to get relatively high wind speeds. Meanwhile soil quality of the installation location should be taken into consideration. Areas with loose sand, uneven soil, or those easily influenced by weather conditions should be not be chosen for wind turbine installation. When selecting the locations, it's necessary to consider the distance between the generator and pile. Shorter distances require less cable and help minimize energy waste during the transmission. When circumstances call for longer distances, a thicker standard cable for transmission is recommended.

Model	200W	300W	500W	1000W	2000W
Semi diameter (m)	2.0	3.0	3.0	3.0	4.0
Size of central base(m) (long*wide*deep)	0.4*0.4*0.3		0.5*0.5*0.4		0.6*0.6*0.5
Size of side base (m) (long*wide*deep)	0.3*0.3*0.3		0.4*0.4*0.3		0.5*0.5*0.4

Model	3000W	5000W	10KW	20KW
Semi diameter (m)	4.0	6.0	6.0	8.0
Size of central base (m) (long*wide*deep)	0.8*0.8*0.8		1.0*1.0*1.0	
Size of side base (m) (long*wide*deep)	0.6*0.6*0.6		1.0*1.0*1.0	

Table 1ext

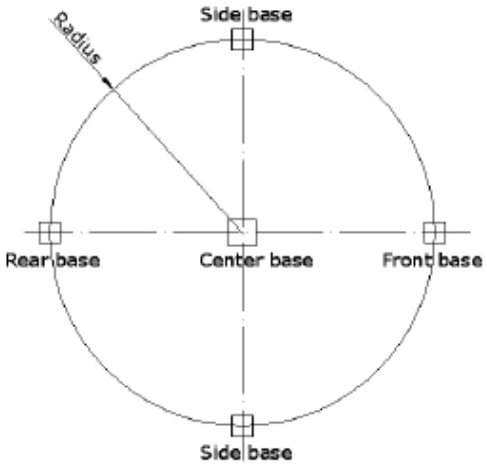

Figure 1: layout of concrete base

Special attention should be paid to the following when laying out the base and anchor:

1. The two anchors should line up with the pin holes on the hinge. i.e. if you draw a line between the two anchors, the line should go through the center of the two pin holes.
2. All the anchors should be on the same level with the tower base so that the pulling force from the two side anchors will be equal. Otherwise, the tower will bend or breakdown when you fasten the rear cable.

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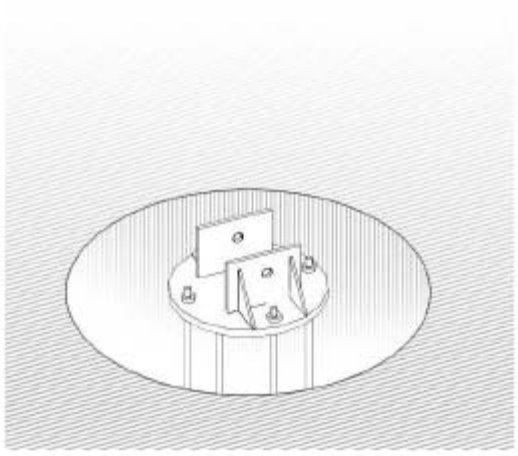
Disclaimer: Since the soil conditions vary from location to location, please consult with a soil analysis company or structural engineering firm in your area about the structural data in this manual. Please understand that A&C will not responsible for the structural failure caused by the base problems.

Step 2. Preparing the Concrete Bases for the Tower and the Anchors

1. Dig the holes to follow the pattern as shown in Fig. 1. Please refer to the Table 1 for the dimensions of the holes.

2. Please choose cement C25. The 4 anchors should be installed with the bolts being plugged in the cement. The 4 anchors should be oriented in the way which is described in step 1. Put the bolts in the cement before it cures. (As shown in the graph 2).



Graph 2

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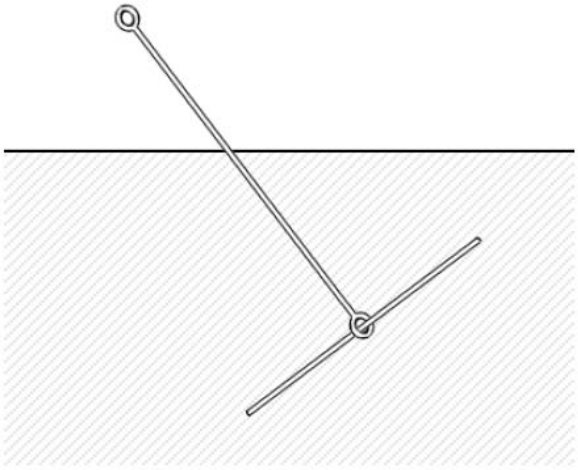
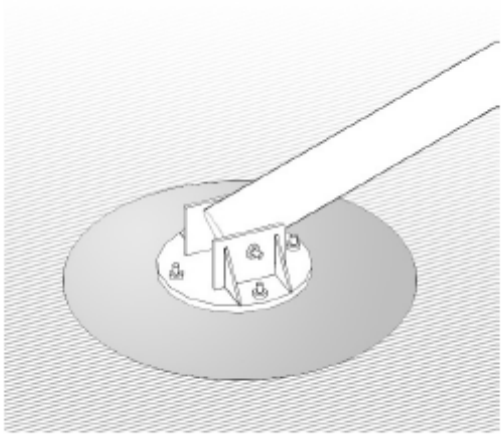
3. The anchors should have a 60° to 80° angle to the horizontal plane. Make sure the anchors are evenly distributed along the circle and they all have the same distance to the center base. All the connection rings should be on the same level. (Graph 3)



Graph 3

Step 4 Assembly the tower and wind turbine

1. Insert the main section of tower into the base, then slide the pin through the tower and base, lock it with the split pin. (As shown in the graph 4)



Graph 4

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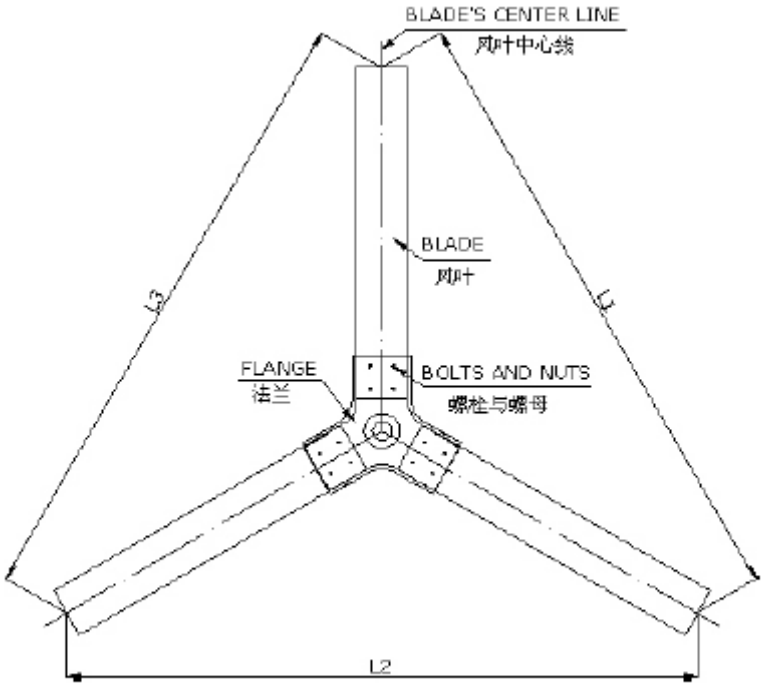
2. Connect each section of tower one by one, and place the tower on the supporting stand after assembly.
3. Insert the generator cables into the tower, and pull the cables out of the main section of the tower.
4. Position the generator on the top of the tower and bolt the running flange and tower flange together. Make sure the hub faces upward in order to install blades.
5. Put the three blades on the hub and put on the press pad. Slide the screws into the holes and put on the nuts. Before tightening the nuts, please make sure the 3 blades are evenly installed by measuring the distance between the blade tips. (Graph 5)



Graph 5

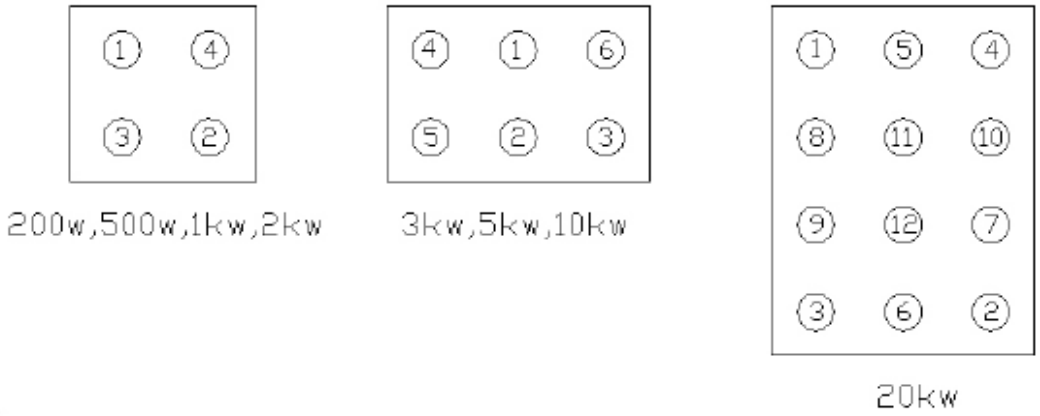
Make sure L1=l2=l3 (Tolerance +/- 5mm)

Notes: Please use torque wrench to tight up the blades. Set the torque based on the followings tables,

System	200 W	300W	500W	1KW	2KW	3KW	5KW	10KW	20KW
Torque	15NM+/-1	15NM+/-1	30NM+/-1	30NM+/-1	30NM+/-1	50NM+/-1	50NM+/-1	50NM+/-1	50NM+/-1

Disclaimer: Please follow the above table for the torque settings. Make sure the wrench is calibrated properly. A&C will not be responsible for any damages caused by improper tightening.

6. Tighten the screws following the order indicated in graph 6, except 300W system. The 300W system has three blade bolts so tight them up one by one.



Graph 6

7. Install the nose cone.

8. For the 3kw and above systems, connect the aviation plug on the generator to the socket of the anemometer, and then install the anemometer onto the generator.

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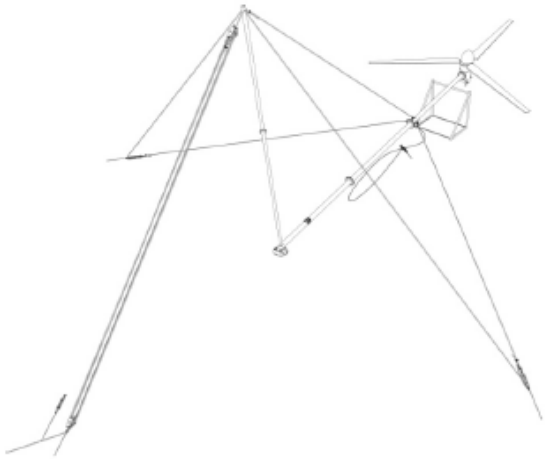
Step 5: Preparation before erecting the tower

(For 3kw and above 3kv wind turbine)

1. Attach the guy-wire onto the tower. The two side guy-wires should be directly connected to side anchor through the turn buckle. The back guy-wire should be connected to the back anchor. Make sure all the guy-wires are not tangled.
2. The Jin-pole is shipped in two segments. Connect the two segments to make one pole.
3. Attach the two thinner wires onto the two ears of the Jin-pole, and then attach the front guy-wire to the front ear on the tower and fix it onto the upper pulley.
4. Insert the Jin-pole into the tower. Attach the two side wires onto the two side anchors, and tighten them.
5. Attach the lower pulley to the front anchor. Attach one end of the longest thinner wire on the pulley of the Jin-pole. Make sure the other side passes through the lower pulley, and then go through the upper pulley. Finally, attach it onto a hoist or tractor (graph 7).



Graph 7

(For 2KW and smaller systems)

1. Connect one end of the 16 meter wire to the winch or tractor.
2. Pass the other end of the wire cable or bracing cord through one end of the ladder (2*4 or 2*5), which will serve as a Jin-pole.

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Step 6: Erecting the tower

1. Drive the winch or tractor slowly and the tower will be raised up gradually. Stop at each 15° rising and check the tension of the guy-wires on both sides. If you find the tension is not balanced, either too loose or too tight, please lower the tower slowly and adjust the length of the guy-wires accordingly. Otherwise keep pulling until the tower stands upright. Separate the cord and fix the front guy-wire to the front anchor.
2. Check and adjust the tension of each guy-wire so that they are evenly balanced. The tension should not be too tight or too loose. Guy wires that are too tight may cause the tower to bend, while being too loose may cause the tower to be unstable.

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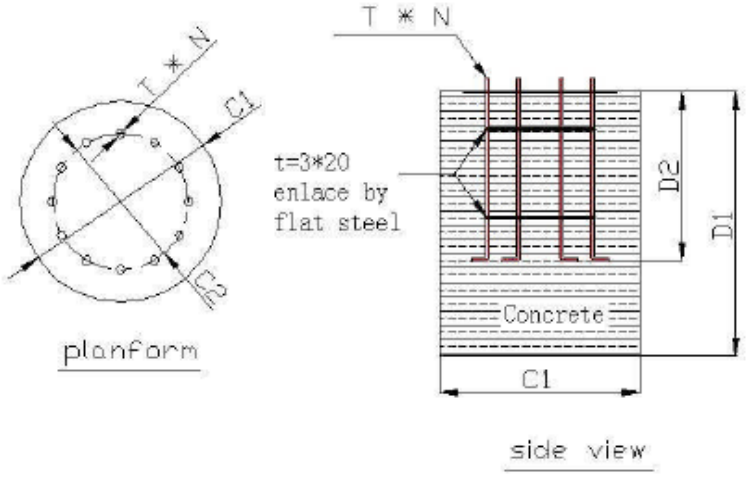
Installation of Tapered Tower

Step 1: Choosing Installation Sites

Please refer to the installation specification of guyed tower (step 1)

Step 2: Make the Concrete Base

Refer to the following graphs with the different product models.



Graph 8

Model	Code in the graph 8	1000W	2000W	3000W	5000W	10KW	20KW
Ground depth(m)	(D1)	1.2	1.5	1.5	1.6	2.0	3.0
Ground diameter(m)	(C1)	1.0	1.0	1.2	1.5	1.8	2.5
Burial depth of cotter bolt (m)	(D2)	0.8	1.2	1.2	1.2	1.6	2.0
Layout diameter of cotter bolt (mm)	(C2)	450	600	600	700	1000	1200
Specification of cotter bolt	(T)	M18	M18	M20	M24	M24	M30
Quantity of cotter bolt	(N)	12	12	12	12	16	16

Table 2

Step 3: Assembly of the tower and the generator

Please refer to the installation specification of guyed tower (step 4)

Step 4: Lifting the tower

While installing the tapered tower a professionally operated crane is needed. Non-working people should be far away from the site when hoisting.

Step 5: Connect the cable to the upper end of the pole and lift gradually.

Step 6: When the tower is at the upright position, align the holes on the tower flange to the holes on the base flange and tighten them.

Connection of the Charger Controller

- IMPORTANT: Refer to Appendix One (1000W and 2000W) or Appendix Two (3000 and above)
- To prevent bodily injury or property damage, please follow these instructions precisely. With personal safety as a primary focus in design, this charge controller has been engineered to function properly and efficiently.

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There are 3 leads coming from the wind generator and they are to be connected to the charge controller. The connectors to be connected should be marked as wind generator inputs. For the 500 W and 1KW change controllers, there are 4 input connectors, 3 red and one black. Please connect to the red connectors only. Do not connect to the black connector.

Please make sure that generator is not generating power when you connect the charge controller and make sure that all the three wires are connected. Not doing so may cause the system damage.

Connection of the Batteries

1. Note- batteries should remain inside dry buildings with a constant temperature environment. Lay out the batteries, controller and inverter.
2. Connect the batteries in series.
3. Lubricate the connectors for better conductance. Install a fuse on the positive electrode of the battery. The distance between the batteries and the controller should not exceed 3m.

4. Suggested battery capacity for various models (as shown in table 3)

Model	200W	300W	500W	1000W	2000W	3000W	5000W	10KW	20KW
Voltage of single battery (V)	12								
Capacity of single battery(AH)	100	200	200	200	150	100	200	400	800
Quantity in series	2	2	2	4	10	20	20	20	30

Table 3

5. Charge Voltages for batteries (as shown in table 4)

Battery voltage(V)	12	24	36	48	120	240	360
Float charge voltage (V)	15	30	45	60	150	300	450
Overvoltage (V)	15	30	45	60	150	300	450
Over charge resume voltage (V)	14	28	42	56	140	280	420
Undervoltage (V)	10.5	21	32	42	105	210	315
Under charge resume voltage (V)	12	24	36	48	120	240	360

Table 4

Electric Wiring

1. Off-grid electric wiring (annex 1)

To ensure safety and easy maintenance, please install the switch and fuse according to the diagram. Check for output voltage consistency of the generator, battery and input of inverter. **A mistake in wire connection could destroy the generator, batteries and inverter.**

(For 3kW Systems and Above)

a) There are two cables extending from the generator head. One cable has an aviation plug and is the anemometer signal cable. The aviation plug should plug into the socket. The other cable has 5 leads (3 thick leads are for power and the 2 thin leads are for controlling signal, one positive and one negative.) These cables should be connected to the back panel of the charge controller accordingly.

b) The anemometer should be installed on top of the generator and vertical to the ground. One end of the anemometer cable should be inserted into the socket under the anemometer and the other end inserted into the socket accordingly.

c) Please refer to appendix 2 for controller specification

2. Grid-tied electric wiring

All the models can be used as grid-tied, with the approval of the local authorities. To do so, the grid-tie controller and inverter are needed when you place the order. Previously quoted prices may vary.

Maintenance

The wind generators may operate under harsh environments and extreme weather situations. Regular inspection and maintenance are necessary to keep the system operating efficiently.

* Using heavy grease, coat the tail connection furling rod. Failed furling can cause your generator to overheat and cause permanent damage. Also grease the generator shaft. Using oil, coat the outside blade mounting brackets. These steps are crucial in preventing possible corrosion of these parts and also could cause generator damage.

3-month maintenance schedule:

1. Check tensions of the guy-wire. Make sure the wires are evenly tightened. The wire should be neither too tight nor too loose. This check has to be done at the installation time and again one week later, to correct any stretching or climactic adjustment.
2. Check electrical wires for connectivity and make sure they are not damaged or corroded.
3. Maintain the batteries as per the battery owner's manual.
4. If at all possible with proper warning before a big storm, lay down the tower to avoid unnecessary loss.

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FAQs and Trouble Shooting

- Why the system may not have output power after the inverter is connected?
    - Check the diversion load and the charge controller. The charge controller has voltage and current indicators. So if there is not enough power generated, the system will not output energy. Also check the battery voltage, since if the battery voltage is low, it will not output energy either. But in case the energy is enough

and there is still not output, please check the electrical wire connections between batteries and inverter and make sure there are no open wire shorts.

- Why the batteries cannot be charged?
  - Check whether or not the rotor is rotating. The generator has no output at too high or too low wind speed. If the rotor works normally, disconnect the generator's wire from the charge controller and check the generator output with a multi-meter. If the generator output is normal, please check if the batteries are ok, otherwise check the generator wiring.
- Why the rotor may not rotate at a normal wind speed?
  - Check if the generator output is short circuited. The generator won't rotate when the generator is short circuited. Be sure to disconnect the batteries from the charge controller when you perform this checking.
- How to lay down the generator?

(For 3kw & above 3kw)

1. Stop the generator. Change control manner to "manual", and then hold on the "*REVERSE*" or "*TURN*" to make the generator turn a 90 degree to the wind direction.
2. After the blades stop rotating, disconnect the three generator leads.
3. Hold down the "*REVERSE*" or "*TURN*" to make the generator's tail face the direction of the ground.
4. Do the reverse steps of installation to lay down the generator.

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(For 2kW & below)

1. Disconnect the generator from the controller. Disconnect the generator output to prevent the generator from running.
2. Perform the reverse steps of the installation to lay down the generator.

- Can I increase the battery capacity to increase the running time for electrical appliances?
  - Increasing the battery capacity may cause the batteries to be under charged and shorten the battery life.

- Wind turbine which is 3KW or above cannot follow wind direction automatically.

  1. Check and make sure the controller has been set to "*AUTO*" position.

  2. Observe the wind speed indication on the controller to check whether the anemometer is broken or not.

  3. Check whether the dogvane is broken or not. First, unplug the dogvane from the controller. There are three plug wires marked ①, ②, ③. Using a multi-meter, measure the resistance between ①and②. The resistance should be approximately 1000Ω. Then measure the resistance between ①and③, along with ②and③.. The resistance figure of these two (① and ③+② and ③) should be equal to the resistance figure between ①and ②

  3. Even if after any suggested checks and/or adjustments, the system still cannot follow the wind direction, the cause is most likely a low wind speed. A properly operating system needs wind speeds of at least 3m/s (about 7mph).

  - How long is the generator's lifespan
    - Under normal care and maintenance, your generator will efficiently produce energy for 15 years.

  If you have further questions, please contact your authorized PowerMax+ agent.

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- Images and photographs may vary.
- This manual may be modified without notice.
- Turbine warranty is 2 years
- Controller and inverter warranties are one year from the date of delivery

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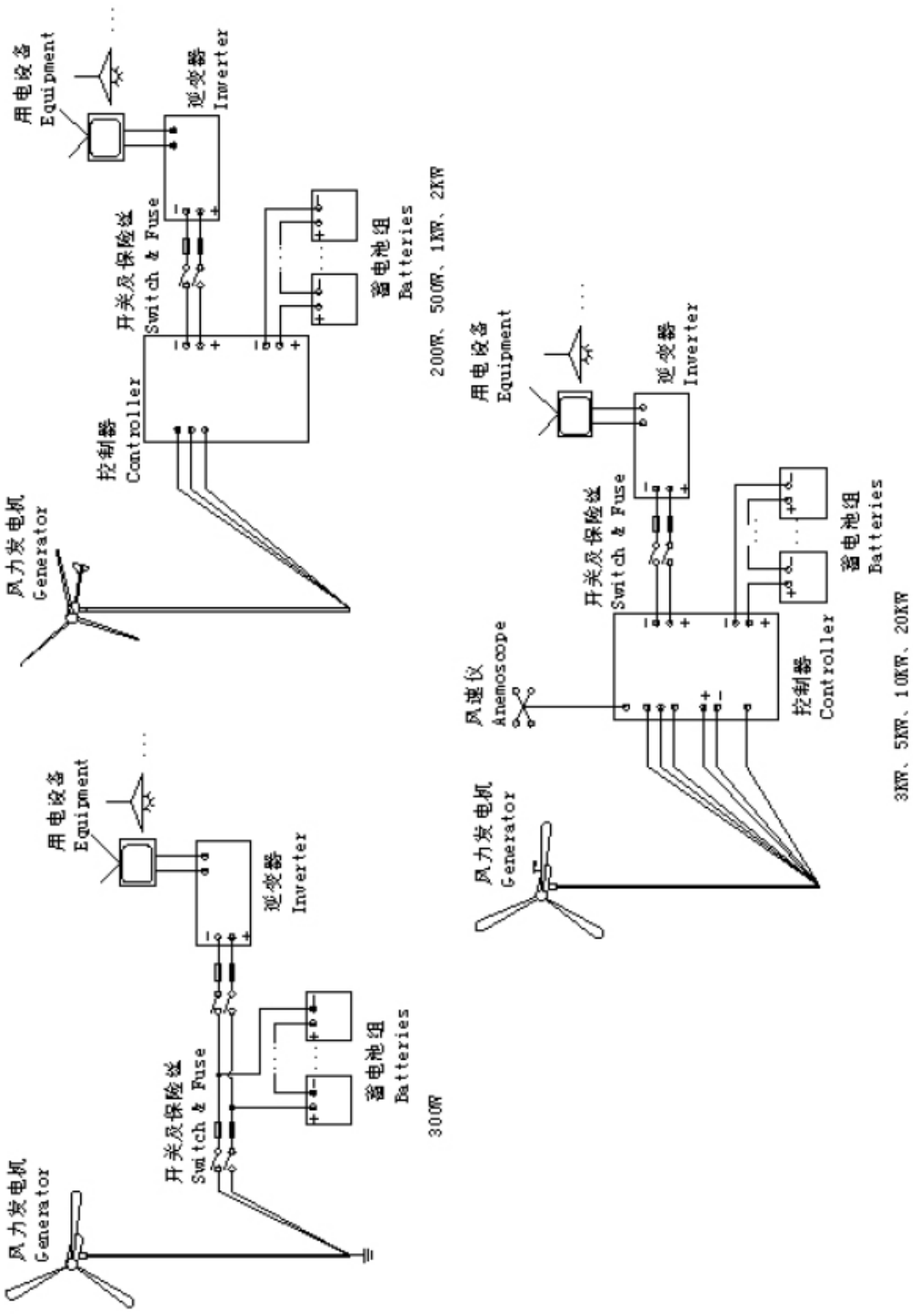
Annex 1: Off-grid electric wiring



Appendix One: Controller Specification (1000W and 2000W only)

1. Security

IMPORTANT: To prevent bodily injury or property damage, please follow these instructions precisely. With personal safety as a primary focus in design, this charge controller has been engineered to function properly and efficiently.

1. Professional installation and guidance is always recommended. Otherwise, please contact your authorized PowerMax+ agent before installation.
2. Keep the charge controller dry. Do not clean with a wet or damp cloth. This is an electric device and cannot get wet at all. Prevent any spills on or near the controller.
3. Keep all children and any person with limited understanding and/or decreased mental capacity away from the controller.
4. Keep the controller away from direct sunlight or any other heat source.
5. Please check the rated voltages of your wind turbine, solar panel and battery before connection. Their rated voltages all should be the same.
6. Pay close attention to the connection of your wind turbine, solar panels and batteries to make sure positive goes to positive and negative goes to negative.
7. Smaller gauge wires should not be used with higher current equipment.
8. Ensure that all component connections are tight and secure.
9. DO NOT TOUCH any bare parts on the controller. The high voltage can cause lethal shock.

2. General Description

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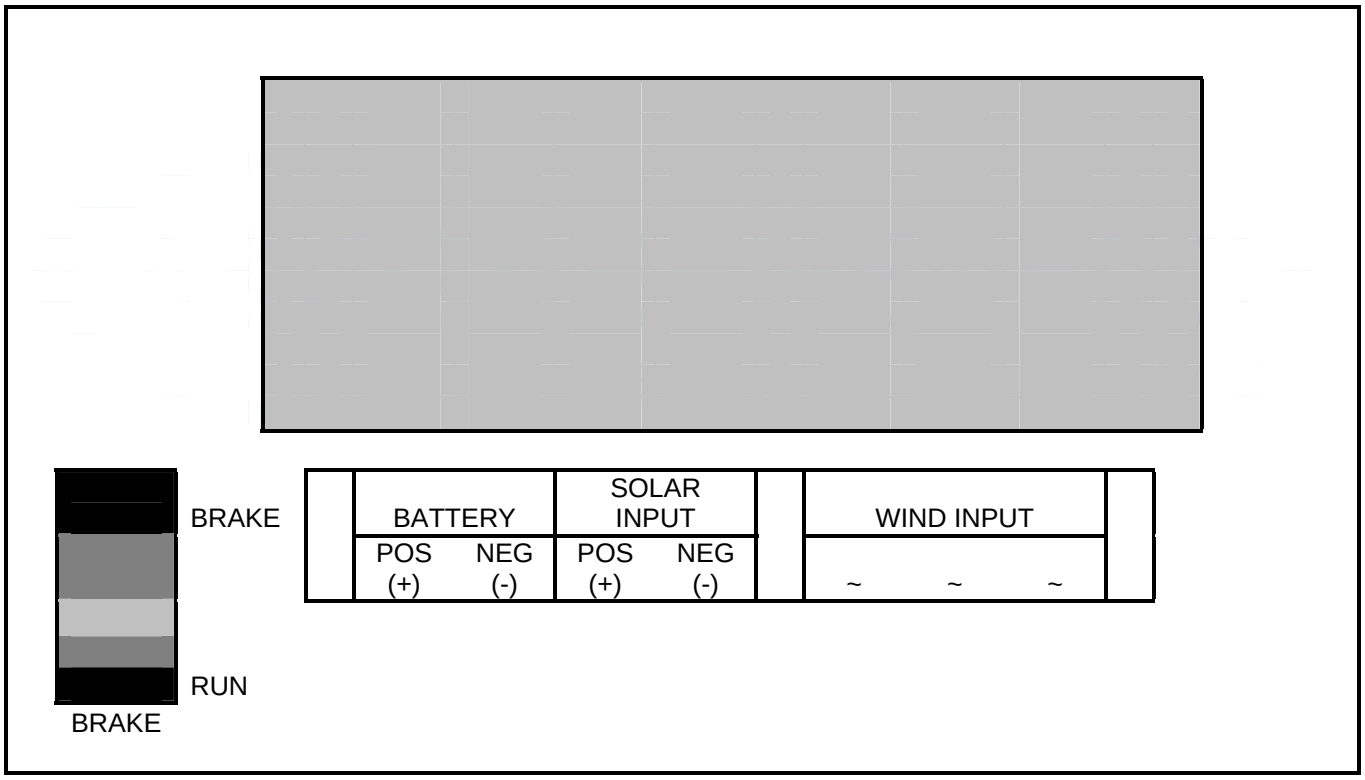
Your PowerMax+ wind/solar hybrid controller is designed to control the wind power charging battery under constant voltage. In addition, it includes a solar charging control, which makes it good for wind/solar hybrid application.

At the right side of the controller, there is a manual brake switch. If the switch is turned to the ‘brake’ position, the wind turbine will be manually stopped.

3. Connection

1. Turn the ‘manual brake’ to the ‘BRAKE’ position, and then connect the output of the wind generator to the ‘WIND INPUT’ terminals using $10mm^2$ cable.
2. If applicable, connect the output of your solar panel to the ‘SOLAR INPUT’ terminals on the PowerMax+ controller. Positive to positive, negative to negative.
3. Using $10mm^2$ cables, connect the battery’s positive pole to the positive (+) ‘battery’ terminal on the controller and connect the battery’s negative pole to the negative (-) ‘battery’ terminal on the controller. The length of the cables should be no longer than three (3) feet. Tighten the nut on each ‘battery’ terminal by hand. Do not over tighten.
4. Turn the ‘manual brake’ to the ‘RUN’ position.

MODEL	PM10-24	PM20-48
Maximum Wind Input Power	1kW	2kW
Maximum PV Input Power	.3kW	.6kW
Rated Battery Voltage	24V	48V
Floating Charge Voltage	28V	56V
Control Mode	charge under limited current and voltage with PWM mode	
Display Mode	LCD	
Displayed Parameter	Battery Voltage, Charge Current	
Protection Type	Pole-confusion protection, Automatic dump-load function	
Size (W x H x D)mm	430x200x370	470x230x410
Weight (KG)	7.2	12



Appendix Two: Controller Specification (3000W and above)

1. Upon system startup, the controlling board will indicate “auto” and “turn-on”. When the wind speed reaches at least 2 m/s under this state, the wind turbine will automatically track the wind direction. If the batteries are full or the wind speed is too strong, the turbine will furl automatically until shutdown.
2. The system can also be manually adjusted for wind direction using “forward” or “reverse”. When the wind speed is strong or the batteries are charged fully, the turbine will not shut down automatically.
3. When the operation of wind turbine is not needed, press the shutdown button or simply turn-off the system. The turbine will automatically face the wind and achieve shutdown.
4. The system will continuously check the batteries’ voltage when the system is under a normal state of generating power. The system has an automatic alarm when over voltage or under voltage. When over voltage, a shutdown order will be transmitted. The over-voltage alarm is set on 300V, alarm voltage cancellation 280V and under voltage alarm 210V when it leaves the factory.
5. The function of the anemoscope is to check the real-time wind speed. This is indicated by “working” or “non-working”. Under working state, the system will automatically face the wind and generate electricity. There are “non-wind” and “over-wind” in the “non-working” state. When in the “non-wind” state, the system moves into sleeping state. In the “over-wind” state, the system will immediately send out a furling order, and then will go into the shutdown mode.

Following table indicates the factory settings:

Model	3000W	5000W	10KW	20KW
Furl 30 degree	12m/s	12m/s	12m/s	13m/s
Furl 60 degree	15m/s	15m/s	15m/s	16m/s
Furl 90 degree (shutdown)	18m/s	18m/s	18m/s	20m/s

Table 5

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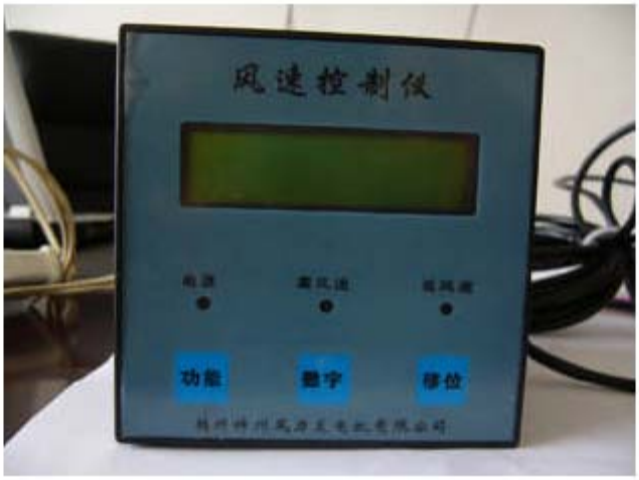
Note: anemoscope should be installed on the wind turbine system of 3kw and above 3kw; otherwise the system will not operate normally.

Appendix Three: Specification of wind-speed monitor (FS01)

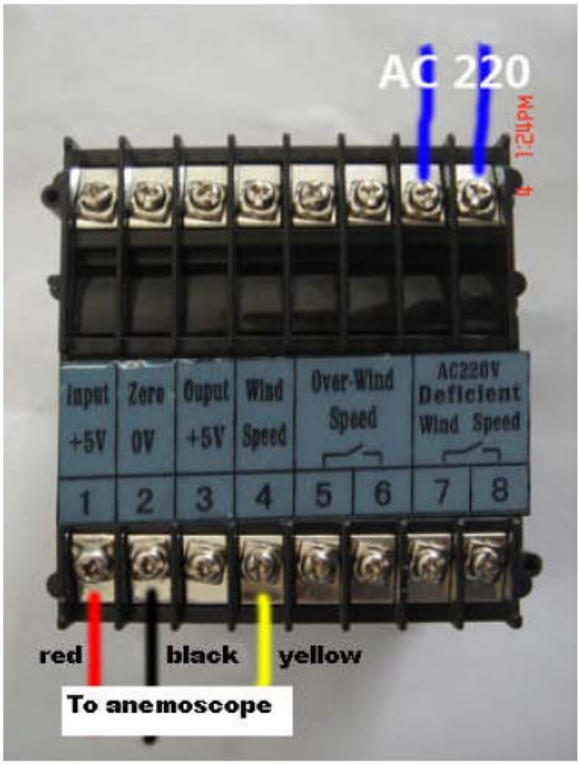
The function of the wind speed monitor (WSM) is to indicate the real-time wind speed and wind scale, sending an alarm when the wind is too weak or too strong. The WSM consists of a wind speed sensor (FS10), wind speed scope (FS100) and connecting wire. System owners are encouraged to use their local wind resources to learn more about using these monitors.

Front of wind speed scope (Picture 9)



Picture 9

Back of wind speed scope & wire-connecting way (Picture 10



Picture 10

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Wind speed sensor (FS10) (Picture 11)

Picture 11

Structural features (Picture 12)

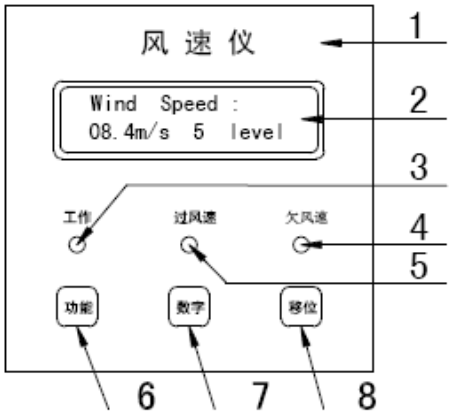

Diagram 12

1. Specification of each part

1) Anemoscope board

2) Liquid crystal: turn-on, the background light is on. (It will shut down automatically after 5 second if there is no operation.) Wind speed figure is displayed, such as 8.4m/s. and wind scale, such as 5.

3) Operation indicating light: The green light is on if it is under normal operation

4) Under wind speed (Wmax) indicating light: When the wind speed is under W≤Wmin state, there will be alarming. Press any key will make the alarming sound nonexistent.

5) Over wind speed (Wmax) indicating light: When the wind speed is under W≥Wmax state, there will be an alarm indication. Pressing any key will make the silence the alarm.

6) Function key: after pressing this key, you will enter into the menu to set the parameters.

7) Figure key: While in the parameters menu, press this key to advance the cursor one space; pressing this key continuously will allow the requisite figure to be set.

8) Shift key: press this key to switch among different figures; combined with figure key, you can set the requisite Wmin, Wmax and return difference.

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2 parameter setting:

a. Press the function key to enter into the setting menu of Wmin and Wmax (as shown in the diagram 13). Unit: m/s; the cursor on the second figure 2; press shift key, modify the figure; press the figure key to modify the figure.

b. When the above procedures have been done, press the function key again once, and you will enter into settings menu of Wmin and Wmax (as shown in the diagram 14). Navigating the settings menu is the same.

c. After having all the figures set, press the function key once again; the LCD screen will display the menu: parameter has been set.

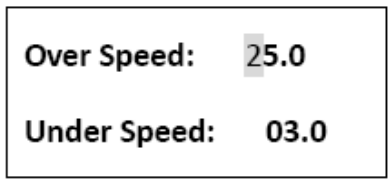

diagram 18

Diagram 13

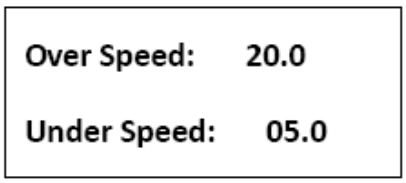

diagram 19

Diagram 14

3 Alarming & relevant display

1) Over wind speed alarm (wind speed W≥Wmax): e.g.: (diagram 15): background light is on, alarming; meanwhile, over wind speed indicator light is on. When under the state of W < Wmax-, the alarming will be unchanged. Wmax-: return difference of over wind speed. Wmax- <= Wmax should be set.

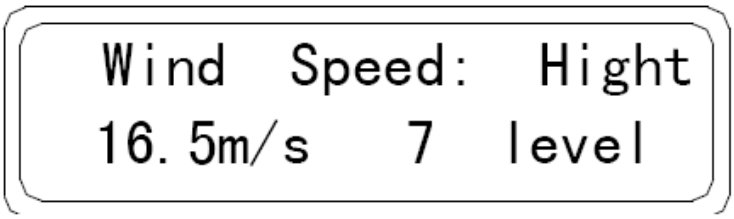

Diagram 15

Note: "wind speed High" means the wind speed is too high.

"16.5m/s" means wind speed is 16.5m/s.

"7 level" means wind scale is 7.

2) Under wind speed alarm (wind speed W≤Wmin): e.g.:(diagram 16): background light is on, alarming; meanwhile, under wind speed indicator light is on. When under the state of W>Wmin+, the alarming will be unchanged. W min+: return difference of under wind speed. Wmin+ >= Wmin should be set. If under wind speed alarming is not needed, please set W min+ and Wmin on zero.

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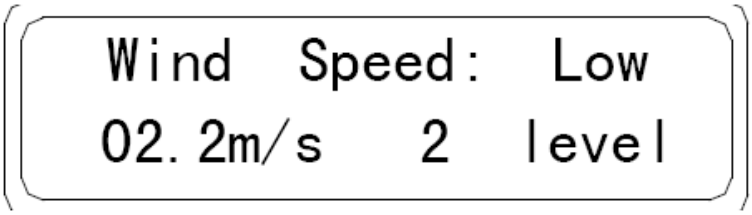

Diagram 16

Note: "wind speed Low" means the wind speed is too low.

"02.2m/s" means wind speed is 02.2m/s.

"1 level" means wind scale is 1.

3) Press any key, and the alarming sound will be unchanged. But the indicator light is still on. The background light will be on again when alarming.

Appendix Four: Specification of Analyzing System for Wind-speed Gathering (FS02)

The system of measuring wind consists of wind-speed sensor (FS10), dogvane (FS20), data collector (FS200) and matched cable. Usually, data collector (FS200) can display the information of wind speed, wind direction and set the parameter. Meanwhile, the following will show the procedure of connecting the wind-measuring system and computer.

FS200 is served as measuring and recording wind speed and wind direction (ready for use). It has a capacity of cycle record of 8000 history record. Targeted - design nixie tube, an LCD screen and keyboard make operation of FS200 easy and convenient. It can also communicate with the computer to record the wind speed and wind direction data, which will be observed and analyzed by FS200.

Feature:

1. Running mode of low power consumption: FS200 will automatically turn off the nixie tube and the LCD screen, so it can run in low power consumption mode.
2. The wind cup of the dogvane sensor is made of carbon fiber, which enhances strength and contributes to the longevity of the equipment.

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Technical index

Measuring range：Wind speed: 0～60m/s		Wind direction: 0～360°
Accuracy:	±0.3m/s	± 3°
Power supply:	AC 220V±20% 50HZ，DC12V、5V are for choice.	
Recording interval:	1min to 60mins	
Communicating joint:	RS-232	
Operating environment temperature: -40℃～50℃		

Installation & Connection

1. Wind - speed Sensor installation

Install the wind-speed sensor on the supporting frame. If there is wind available, the three cups of wind-speed sensor will run.

2. Connection of FS200 and wind-speed sensor

Insert the aviation plug of the wind-speed sensor's signal line into the aviation socket of FS200.

3. Connecting FS200 to power supply

12V power supply is applied to FS200. Connect FS200 to 12V power supply. Special attention is paid to the anode and cathode and do not reverse them.

Check the wind-speed sensor, the connection between wind-speed sensor, and the correct connection of the FS200 power supply. If there is no problem concerning these aspects, you can power it up. When the FS200 is running, the present wind speed is displayed on the nixie tube while the present wind direction is displayed on the LCD screen.

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PH3000 Operation

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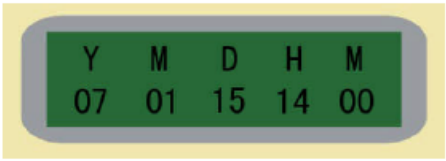
Note: Illumination: the four direction keys control the movement of the cursor, press "→" to enter the menu option, press "←" to return to the up menu, press "+" ("-") to increase (decrease) the parameter.

MENU (Picture 18)

Picture 18

System time setting (Pic19)



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Picture 19

"+" "-" to change the system time, "←" to exit the set of system time, then auto update the system time, then auto update the system time.

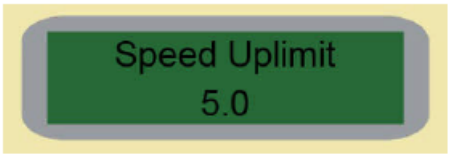
Record interval (Picture 20)

Picture 20

It is used to set interval of the history data, 1 min~60 min adjustable. Suppose that it is set 2 minutes, and then the time of PH3000 can record is:

8000/30 min/24 hours = 11 days

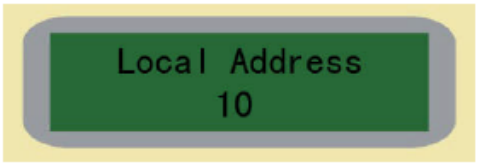
Alarm set (Picture 21)



Picture 21

When wind speed exceeds the upper limit, relay is closed and an alarm will sound. This function is optional.

Local address (Picture 22)



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It is used when communicating with the computer and corresponds to the weather station ID of the computer software.

After correct set-up, the PH3000 will work persistently.

FS200 and Computer Connection

Connect the RS232 serial of the FS200 to the RS200 serial of the computer and have the FS2000 computer software run. The PH computer software reads the present wind direction monitored by the dogvane. This history data can be saved to a Microsoft ASSEDD database and can be analyzed through either a table or curve view. The computer software can also set the parameters of the real time clock and history data recording interval of the dogvane.

Operation of software FS200 (diagram 23)

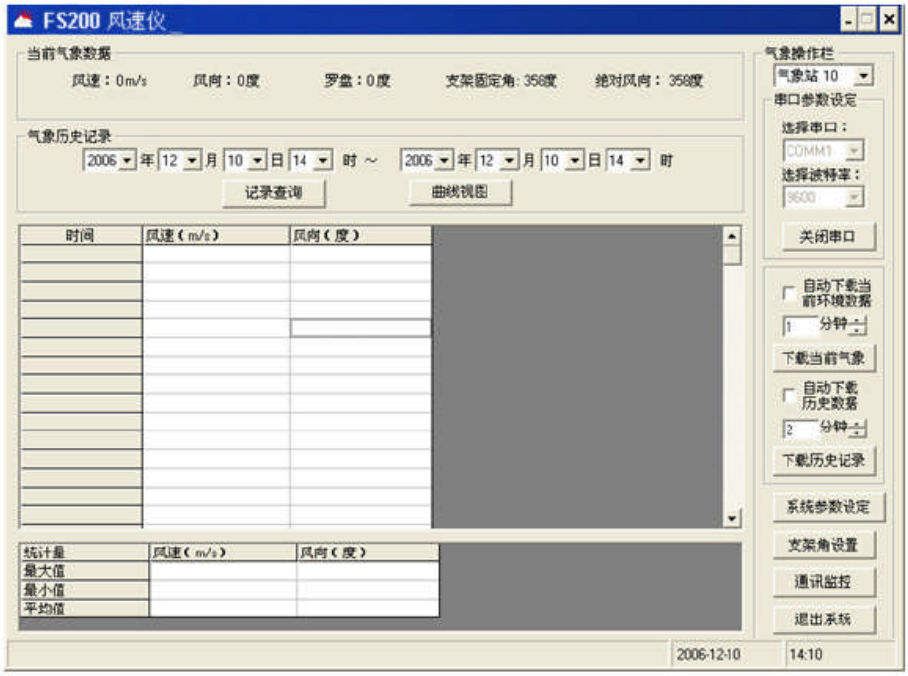

Diagram 23

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Choosing weather station

The system default is weather station 10, which is consistent with the address of the wind-speed dogvane.

Open serial

Choose the serial, and set the communication baud rate on 9600bps, and then open the serial port.

Read the setting data

Click the download button to get the current wind speed and wind direction data. Or click “update the settings data automatically” to choose the time interval for automatic updating. The software can automatically gather wind speed and direction at a programmed interval.

Download the history data

Read the history data of the anemoscope by clicking the “reading history data” button. The history data is saved in the Microsoft Access database. Users can observe and analyze history data of wind speed by either table or curve view.

Setting system parameter (Diagram 24)

Diagram 24

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The system parameters of the anemoscope include clock parameter, time interval of history record and alarm set.

Setting of supporting angle (Picture 25)

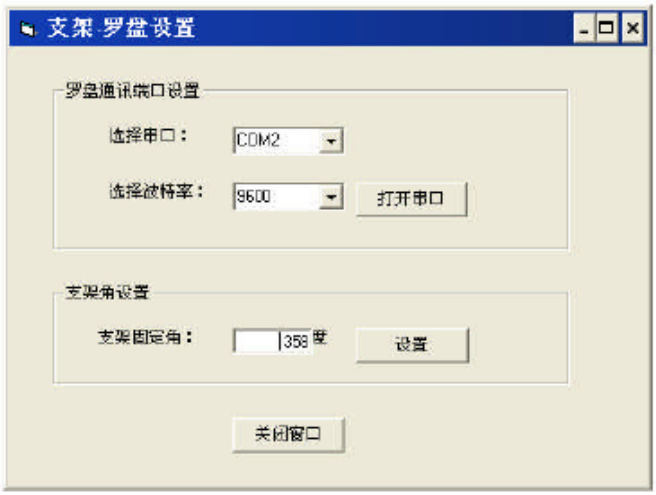

Diagram 25

Curve view (Diagram 26)

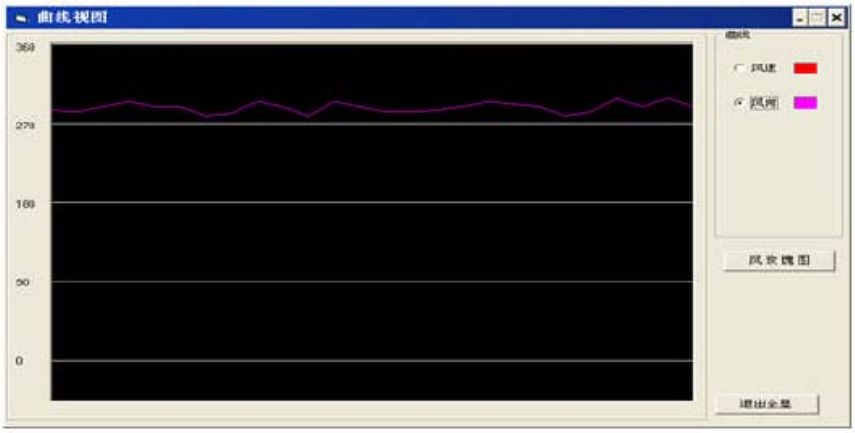

Diagram 26

To view a curve diagram of a certain history, select the data scope of the history you need to check, and then click the curve view.

Rose diagram of wind (Diagram 27)

Diagram 27

A rose diagram of wind can illustrate the distribution and scope of different wind directions all the year around.